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# ROCKY MOUNTAIN FOREST AND RANGE EXPERIMENT STATION

## Growing Fourwing Saltbush Transplants for Field Planting<sup>1</sup>

Earl F. Aldon<sup>2</sup>

Seeds can be germinated in plant bands when air temperatures are around 65°F. Seedlings should be transplanted when soil moisture conditions are optimum. (KEY WORDS: *Atriplex canescens*, fourwing saltbush, flood control, watershed management, soil-binding plants, transplanting)

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Fourwing saltbush or chamiza (*Atriplex canescens* (Pursh) Nutt.) is currently being planted for erosion control and as wildlife food and cover by the Bureau of Land Management on the Rio Puerco in New Mexico. For two consecutive years, field plantings have been made with 4- to 6-week-old transplants. Success of these field plantings is reported elsewhere.<sup>3</sup> Of several different methods tried for growing these transplants, the most successful one is reported in this Note.

### Previous Work

Springfield<sup>4</sup> has shown that the optimum temperature for germinating fourwing saltbush is between 55° and 75° F; seeds began germinating within 3 days at 65° and 73° F. Germination of this seed is highest when moisture approximates field capacity, but moisture stress may be less important at optimum temperatures.<sup>5</sup>

Special storage conditions for fourwing saltbush seeds are not necessary.<sup>6</sup> Refrigeration did not improve the retention of seed viability. Viability was retained at a high level for 6 years when seeds were stored under dry conditions at temperatures of 55° to 95° F.<sup>6</sup>

<sup>1</sup>Research reported here was conducted in cooperation with the Bureau of Land Management, U. S. Department of the Interior, Albuquerque, New Mexico.

<sup>2</sup>Principal Hydrologist, located at Albuquerque, in cooperation with the University of New Mexico; central headquarters maintained at Fort Collins, in cooperation with Colorado State University.

<sup>3</sup>Aldon, Earl F. Fourwing saltbush can be field planted successfully. 1970. (In preparation for publication, Rocky Mt. Forest and Range Exp. Sta., U. S. Dep. Agr., Forest Serv., Ft. Collins, Colo.)

<sup>4</sup>Springfield, H. W. Temperatures for germination of fourwing saltbush. J. Range Manage. 22: 49-50, illus. 1969.

<sup>5</sup>Springfield, H. W. Germination of fourwing saltbush seeds at different levels of moisture stress. Agron. J. 58: 149-150, illus. 1966.

<sup>6</sup>Springfield, H. W. Cold storage not required for fourwing saltbush seeds. J. Range Manage. 21: 335-336. 1968.

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## Methods

1. Collect seeds from plants growing near the site where planting is contemplated (fig. 1). One large plastic garbage bag (30 gal. size) full will yield enough seeds for 2,000 transplants. Gather in late October or early November after seeds are mature and dry, but before they fall. Seeds are a light brown color at this time (all times used in this Note refer to conditions near Albuquerque, New Mexico).
2. Store in open plastic bags in a dry place over-winter at room temperature.
3. In early April, remove wings from seeds by rubbing between the palms of hands. The winged chaff is easily blown away. A wide-mesh screen can be used to collect the seeds and let the chaff drop through if hand rubbing leaves some of the wings attached.
4. Select 100 seeds at random and cut them in half (a nail clipper works well). Count the filled and hollow seeds. The filled seeds usually are viable (capable of germinating).
5. Compute the number of seeds needed to insure one plant in each plant band as follows:

$$\begin{array}{r} 100 \text{ seeds cut open} \\ 70 \text{ were empty} \\ 30 \text{ were filled} \\ \hline 30 = 0.3 \text{ viable seed} \\ 100 \end{array}$$

In this instance, if 15 seeds are planted, probably 4 will germinate.

6. Use 2-inch by 2-inch wide and 3-inch deep heavy-weight felt paper plant bands (fig. 2). Place bands in old fruit or vegetable crates for support. Crates that hold about 42 plant bands are easily handled. These crates should have chicken wire on the bottom for added strength and a thick plastic sheet over the wire. The plastic sheet keeps taproots from penetrating the soil surface if bands are in contact with the ground. The plastic sheet is important, for when the taproot hits this impermeable layer it will turn. When this happens, top growth seems to be stimulated.
7. Mix thoroughly 2/3 good garden soil with 1/3 soil taken from under a fourwing saltbush plant. This extra mix is necessary to inoculate the plant with growth-stimulating microorganisms. The specific organism has not been isolated as yet, but plants grown in this mix do better than those grown in garden soil only.
8. Put soil to within 1/2 inch from the top of the plant bands. Tamp in place. No special material such as gravel is needed at the bottom of the bands.
9. Place enough seeds on the surface to produce about four seedlings and cover with 1/4 inch of the soil mix. Planting should start sometime between mid-April and mid-May when outdoor temperatures are optimum (65° F.).
10. Water four times daily, or as needed, with a fine mist to keep the surface moist. Heavy watering will float seeds out of soil. Keep the bands in a location where the sun will hit



Figure 1.--A mature plant with ripe seeds. Seeds should be golden yellow before they are collected.



Figure 2.--Four- to six-week-old seedlings growing in plant bands.

them for several hours a day. When plants are up 1/2 inch they can be flooded from the top when needed.

11. When plants are about 3 weeks old, thin to one per band.
12. Remove grasses and weeds from the bands as they appear.

#### Field Planting

1. Plant in areas that will be flooded periodically but will not be inundated for longer than 30 hours.<sup>7</sup>

2. Plant in late July or early August after the area has received some moisture. The soil should not be too dry.
3. Seedlings should be planted before 10:00 a.m. to keep stresses on plants to a minimum.
4. Keep plants shaded or covered and well watered while transporting to the planting site and while at the site.
5. Use a post-hole digger to make a 4-inch-deep hole for planting.
6. Insert plant band and tamp soil around it. Roots apparently do not need to be laid straight down. They can be bent around but should not be broken.
7. Plant at 5-foot spacing. In favorable years, plants can grow 2 feet tall in the first year.
8. Cover transplanted seedlings with straw to minimize stresses.
9. Spray straw mulch and fourwing saltbush plants with a 1:1 mixture of water and animal repellent.

<sup>7</sup>Aldon, Earl F. Fourwing saltbush survival after inundation. USDA Forest Serv. Res. Note RM-165, 3 p., illus. 1970. (Rocky Mt. Forest and Range Exp. Sta., Ft. Collins, Colo.)

